

CLAIMS

1. A network appliance for providing packetized data over a packet data network, comprising:
a network controller subsystem coupled to said packet data network;
5 a digital signal processing subsystem coupled to said network controller subsystem, the digital signal processing subsystem further comprising a computer program for detecting incoming calls and initiating call sessions;
a signal conversion subsystem coupled to said digital signal processing subsystem; and
10 a user interface subsystem coupled to both the signal conversion subsystem and said digital signal processing subsystem.

2. The network appliance according to claim 1, wherein said digital signal processing subsystem comprises a digital signal processor (DSP) and one or more memory devices coupled to said digital signal processor.

3. The network appliance according to claim 2, wherein said computer program implements the Session Initiation Protocol for detecting and initiating call sessions and performing call session control.

4. The network appliance according to claim 3, wherein a unique SIP address is associated with the appliance, said address being stored in at least one
20 of said memory devices.

5. The network appliance according to claim 4, wherein the packetized data includes audio data and wherein the user interface subsystem comprises:

25 a handset comprising an input device, a microphone and a speaker;
and
a display device.

6. The network appliance according to claim 5, wherein said computer program implements a monitor feature, wherein on detection of a call directed to the appliance from a caller, a call session is automatically initiated with said microphone enabled and said speaker disabled during the call session.

5 7. The network appliance of claim 6, wherein identifying criteria of at least one approved caller is stored in at least one of said memory devices and wherein said digital signal processor receives identifying criteria from the caller and activates the monitor feature only if the received identifying criteria matches at least one of the stored identifying criteria of said at least one predetermined approved
10 caller.

8. The network appliance of claim 7, wherein said identifying criteria are selected from the group including name, SIP address and password.

9. The network appliance according to claim 3, wherein the computer program implements a call forwarding feature, wherein at least one
15 forwarding SIP address is stored in at least one of said memory devices, at least one of said forwarding SIP addresses being selectable by a user via said user interface subsystem, and wherein on detection of a call directed to the appliance from a caller, said call is redirected to the selected forwarding SIP address.

10 10. The network appliance according to claim 9, wherein said call forwarding feature is activated for a predetermined time in response to an input from the user.

11. The network appliance according to claim 9, further comprising a sensor coupled to said appliance for detecting the absence of a human being, wherein said call forwarding feature is activated in response to a signal from said
25 sensor.

12. The network appliance according to claim 1, wherein the user interface subsystem includes an output device and wherein the computer program implements a streaming media mode wherein streaming data is received from the network and is converted to perceptable signals provided to said output device.

5 13. The network appliance according to claim 12 wherein the output device includes a speaker and wherein when no call session is in progress streaming data is received from the network and is converted to audio signals provided to said speaker.

10 14. The network appliance according to claim 13 wherein the program reverts out of streaming media mode in the event a new call session is initiated.

15 15. The network appliance according to claim 12 wherein the output device includes a speaker and wherein streaming data is selectively received from the network and is converted to audio signals provided to said speaker.

16 16. The network appliance according to claim 12 wherein the streaming data is received from the network and is selectively forwarded to another device during a call session where the data is convertible to perceptable signals by said device.

20 17. The network appliance according to claim 12 wherein the output device includes a video display and wherein streaming data includes streaming video data which is selectively received from the network and is converted to video signals provided to said display.

25 18. The network appliance of claim 3, wherein the user interface subsystem includes a display device and wherein the digital signal processor detects the SIP address of callers and stores a plurality of caller SIP addresses in at least one

of said memory devices, said plurality of caller SIP addresses being displayable on said display device and selectable in response to an input from the user interface subsystem.

19. The network appliance of claim 3, wherein the user interface subsystem includes a display device and wherein the digital signal processor stores a plurality of called SIP addresses in said memory device, said called SIP addresses corresponding to the address of successfully initiated call sessions and being displayable on said display device and selectable in response to an input from the user interface subsystem.

20. The network appliance according to claim 1, wherein said network controller subsystem comprises an Ethernet controller and a service filter.

21. The network appliance according to claim 2, wherein said digital signal processing subsystem further comprises:

- an analog-to-digital (A/D) converter for converting incoming audio data into digital incoming audio data;
- an encoder coupled to said A/D converter for encoding said digital incoming audio data;
- a decoder for decoding digital outgoing audio data provided by said digital signal processing subsystem;
- an digital-to-analog (D/A) converter coupled to said decoder for converting digital outgoing audio data into outgoing audio data; and
- an audio amplifier coupled to the handset and the corresponding speaker and microphone for conditioning said incoming and outgoing audio data.

22. The network appliance according to claim 1, wherein the computer program further comprises:

- an Ethernet protocol layer;
- an Internet Protocol (IP) layer stacked on top of said Ethernet protocol

layer for interfacing with said Ethernet protocol layer;

an Address Resolution Protocol (ARP) layer stacked on top of said Ethernet protocol layer for interfacing with said Ethernet protocol layer and said IP layer, and for translating IP addresses into Media Access Control (MAC) addresses;

5 a User Datagram Protocol (UDP) layer stacked on top of said ARP and IP layers for interfacing with said ARP and IP layers and for providing real-time transport of application data and controls within said telecommunication system,;

a Real-Time Transport Protocol (RTP) layer stacked on top of said UDP layer for interfacing with said UDP layer and for providing real-time audio data
10 transport within said telecommunication system;

one or more control protocol layers stacked on top of said UDP layer for interfacing with said UDP layer and for signaling and providing registration of said real-time audio data; and

one or more application protocols stacked on top of said RTP layer for
15 interfacing with said RTP and for formatting said real-time audio data.

23. The network appliance of claim 22, wherein said application protocols include an RTSP protocol layer.

24. The network appliance according to claim 1, further comprising at least one sensor interface circuit, said sensor interface circuit being operatively
20 coupled to the digital signal processing subsystem and having a port for operatively coupling the appliance to a remote sensor.

25. The network appliance according to claim 24, wherein the digital signal processing subsystem acquires data from the sensor interface circuit at predetermined time intervals, formats the acquired data as network packet data and
25 transmits the data to a predetermined destination on the network.

26. The network appliance according to claim 24, wherein the digital signal processing subsystem acquires data from said sensor interface circuitry

in a substantially continuous manner and formats the acquired data as network packet data and transmits the data to the network when said acquired data satisfies at least one predetermined criterion.

5 27. The network appliance according to claim 24, wherein the sensor interface circuitry includes an interrupt service request input and wherein said digital signal processing subsystem acquires data from said sensor interface circuit in response to a signal on said interrupt service request input, formats the acquired data as network packet data and transmits the data to a predetermined destination on the network.

10 28. The network appliance according to claim 24 wherein the computer program includes a call forwarding feature, said feature being selectively enabled in response to a signal applied to said sensor interface circuit.

15 29. The network appliance according to claim 28 further comprising a sensor for detecting the presence of a human being coupled to said sensor interface circuit and providing the signal for selectively enabling the call forwarding feature.

20 30. A packet data network system comprising:
 at least one data network appliance for receiving and generating packetized data, said data network appliance comprising:
 a network controller subsystem coupled to said packet data network;
 a digital signal processing subsystem coupled to said network controller subsystem, the digital signal processing subsystem further comprising a computer program for detecting incoming calls and initiating call sessions;
 a signal conversion subsystem coupled to said digital signal
25 processing subsystem; and
 a user interface subsystem coupled to both the signal conversion subsystem and said digital signal processing subsystem;

a local area network coupled to said data network appliances for networking said data network appliances; and

a gateway coupled to said local area network for receiving voice data from a conventional telephone network and for providing and receiving packetized voice data from and to said data network appliances.

31. A packet data network system comprising:

a packet data network;

at least two data network telephone nodes for receiving and generating packetized data including voice data, each node having a unique network address, said telephony nodes being operatively coupled to said packet data network and being directly accessible by each other telephony node by said address;

a redirect server, said server being operatively coupled to said network and being accessible by each node on said network, said server having at least one database relating the unique network addresses of at least one node on said network to at least one parameter.

32. The packet data telephone system of claim 31 wherein the unique network addresses are SIP addresses.

33. The packet data telephone system of claim 31, wherein the at least one parameter is a redirection network address associated with said unique network address of a registered telephony node, said server providing the redirection network address to nodes accessing the server to initiate a call with said registered telephony node.

34. The packet data telephone system of claim 31, wherein the at least one parameter is a plurality of redirection network addresses associated with said unique network address of a registered telephony node, said server broadcasting a call request to each of the redirection network addresses in response to a node accessing the server to initiate a call with said registered telephony node, and said server

initiating a call session between the node accessing the server and the first redirect network address node to respond to said broadcast.

5 35. The packet data telephone system of claim 31, wherein the at least one parameter is a plurality of redirection network addresses associated with said unique network address of a registered telephony node and said database further includes at least a second parameter, said server providing a selected redirection network address to nodes accessing the server to initiate a call with said registered telephony node in accordance with said second parameter.

10 36. The packet data telephone system of claim 35, wherein said second parameter is the day of the week.

37. The packet data telephone system of claim 35, wherein said second parameter is the time of the day.

38. The packet data telephone system of claim 35, wherein said second parameter is the SIP address of the calling party.

15 39. The packet data telephone system of claim 31, wherein the first parameter includes a name and physical address of the node.

40. The packet data telephone system of claim 31, wherein at least one of the telephony nodes is a network appliance in accordance with claim 1.

20 41. A communication protocol for use in a packet-based telecommunication system, comprising:
an Ethernet protocol layer;
an Internet Protocol (IP) layer stacked on top of said Ethernet protocol layer for interfacing with said Ethernet protocol layer;

an Address Resolution Protocol (ARP) layer stacked on top of said Ethernet protocol layer for interfacing with said Ethernet protocol layer and said IP layer, and for translating IP addresses into Media Access Control (MAC) addresses;

5 a User Datagram Protocol (UDP) layer stacked on top of said ARP and IP layers for interfacing with said ARP and IP layers and for providing real-time transport of application data and controls within said telecommunication system,;

a Real-Time Transport Protocol (RTP) layer stacked on top of said UDP layer for interfacing with said UDP layer and for providing real-time data transport within said telecommunication system;

10 one or more control protocol layers stacked on top of said UDP layer for interfacing with said UDP layer and for signaling and providing registration of said real-time audio data; and

one or more application protocols stacked on top of said RTP layer for interfacing with said RTP and for formatting said real-time data.

15 42. The communication protocol according to claim 41, wherein the application protocols include an RTSP protocol layer.

43. A computer program for operating a network device, comprising:

20 a first layer of instructions for providing interrupt services and low-level functions;

a second layer of instructions comprising the operating system and instructions for performing process level functions; and

25 a third layer of instructions for performing application-specific tasks and high-level functions, including the Session Initiation Protocol for detecting and initiating call sessions and performing call session control.

44. The computer program for operating a network device according to claim 43, wherein said computer program implements a monitor feature, wherein on detection of a call directed to the appliance from a caller, said microphone

is automatically enabled and said speaker is automatically disabled during the call.

45. The computer program for operating a network device according to claim 44, wherein identifying criteria of at least one approved caller is stored in said device and wherein identifying criteria from a caller is received, the
5 program activating the monitor feature only in response to said caller being a predetermined approved caller.

46. The computer program for operating a network device of claim 45, wherein said identifying criteria are selected from the group including name, SIP address and password.

10 47. The computer program for operating a network device according to claim 43, wherein a call forwarding feature is provided, wherein at least one forwarding SIP address is stored in the device, one of said forwarding SIP addresses is selectable by a user, and wherein on detection of a call directed to the device from a caller, the call is redirected to the selected forwarding SIP address.

15 48. The computer program for operating a network device according to claim 47, wherein said call forwarding feature is activated for a predetermined time in response to an input from the user.

20 49. The computer program according to claim 47, wherein a signal from a sensor for detecting the absence of a human being is provided to said program as an input and wherein said call forwarding feature is selectively activated in response to the signal.

25 50. The computer program for operating a network device according to claim 43, wherein the computer program implements a streaming media mode wherein streaming data is received from the network and is converted to perceptible signals by said network device.

51. The computer program for operating a network device according to claim 50, wherein when no call session is in progress, streaming data is received from the network and is converted to audio signals provided to said device.

5 52. The computer program for operating a network device according to claim 51, wherein the program reverts out of streaming media mode in the event a new call session is initiated.

10 53. The computer program for operating a network device according to claim 50, wherein the streaming data is received from the network and is selectively forwarded to another device during a call session where the data is convertible to perceptable signals by said another device.

54. The computer program for operating a network device according to claim 50, wherein the network device includes a video display and wherein streaming data includes streaming video data which is selectively received from the network and is converted to video signals provided to said display.

15 55. The computer program for operating a network device of claim 43, wherein the program detects the SIP address of callers and stores a plurality of caller SIP addresses in said network device, said plurality of caller SIP addresses being displayable on said network device and selectable in response to an input from the user.

20 56. The computer program for operating a network device of claim 43, a plurality of called SIP addresses are stored, said called SIP addresses corresponding to the address of successfully initiated call sessions and being displayable on a display device and selectable in response to an input from the user interface.

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